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RS485 Isolator 3 Click

PID: MIKROE-5597

RS485 Isolator 3 Click is a compact add-on board that provides electrical isolation and signal conditioning for RS485 communication systems. This board features the ADM2763E, a 500kbps, 5.7kV RMS, signal-isolated RS-485 transceiver from Analog Devices. The ADM2763E is protected against ≥±12 kV contact and ≥±15 kV air IEC 61000-4-2 electrostatic discharge (ESD) events on the RS485 A, B, Y, and Z pins. Besides receiver/driver control pins, it also features a receiver cable invert pin to quickly correct the reversed cable connection on the A and B receiver bus pins while maintaining complete receiver fail-safe performance. This Click board™ is suitable for many industrial and automation applications that require insulation against working voltages of 1060V RMS and 1500VDC for the device's lifetime.

RS485 Isolator 3 Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

How does it work?

RS485 Isolator 3 Click Click is based on the ADM2763E, a 5.7kV RMS signal isolated RS-485 transceiver from Analog Devices. The ADM2763E is optimized for low speed over long cable runs and has a maximum data rate of 500kbps. It is protected against ≥±12 kV contact and ≥±15 kV air IEC 61000-4-2 electrostatic discharge (ESD) events on the RS485 receiver and driver terminal pins, easily accessible via the screw terminal blocks. The ADM2763E has four bus signals: signal A for the noninverting input signal, signal B for the inverting input signal, signal Y for the noninverting output signal, and signal Z for the inverting output signal, alongside a common ground connection.

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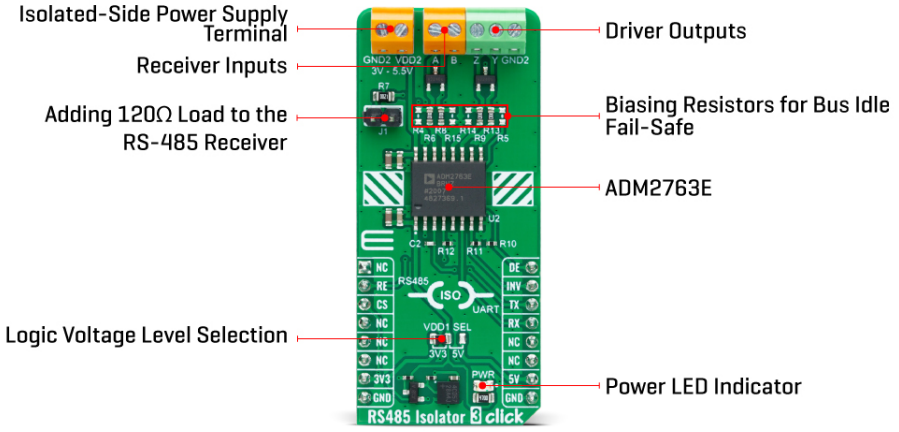

Using coplanar transformer coils with an ON or OFF keying modulation scheme allows a high data throughput across the isolation barrier of the ADM2763E while minimizing radiation emissions. Architecture like this provides a digital isolator with immunity to common-mode transients >250 kV/µs across the device's full temperature and supply range. The ADM2763E also features a proprietary transmitter architecture with a low driver output impedance that increases the differential output voltage. The high differential output voltage extends the reach of the ADM2763E to longer cable lengths and makes this board suitable for PROFIBUS® nodes when powered with 5V on the isolated side of a supply (isolated-side provides the possibility of a supply voltage in the range from 3V to 5.5V).

Besides commonly used UART TX and RX pins on the mikroBUS™ socket, this board also has receiver and driver enable pins routed to the RE and DE pins of the mikroBUS™ socket. It also features a receiver cable invert pin, routed to the INV pin of the mikroBUS™ socket, to quickly correct the reversed cable connection on the A and B receiver bus pins while maintaining complete receiver fail-safe performance.

In addition, the ADM2763E has a built-in receiver fail-safe for the bus idle condition, accessible through some of the unpopulated onboard jumpers (the R4 and R5 pull-up resistors to the VDD2 isolated-side supply on the ADM2763E pins A and Y, as well as the R14 and R15 pull-down resistors to the GND2 common ground connection on pins B and Z). These resistors can be fitted if the user connects this board to other devices that require external biasing resistors on the bus. The ADM2763E also has a jumper that allows adding a 120Ω load to the RS485 receiver by placing the jumper cap on it.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VDD1 SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. However, the Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Isolators,RS485
Applications	Can be used for many industrial and automation applications that require insulation against working voltages of 1060V RMS and 1500VDC for the device's lifetime

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On-board modules	ADM2763E - 5.7kV RMS signal isolated RS-485 transceiver from Analog Devices
Key Features	Low radiated emissions, receiver cable inversion smart feature, ESD protection on the RS485 A, B, Y, and Z bus pins, low speed 500kbps data rate, flexible power supply inputs, PROFIBUS® compliant for 5V VDD2, built-in receiver fail-safe for the bus idle condition, allows adding a 120Ω load to the RS485 receiver, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on RS485 Isolator 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
	NC	1	AN	PWM	16	**DE**	Driver Enable
Receiver Enable	**RE**	2	RST	INT	15	**INV**	Receiver Cable Invert
	NC	3	CS	RX	14	**TX**	UART TX
	NC	4	SCK	TX	13	**RX**	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VDD1 SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
J1	J1	Populated	Jumper for adding a 120Ω load to the RS485 receiver
R4, R5, R14, R15	R4, R5, R14, R15	Unpopulated	Biasing Resistors for Bus Idle Fail-Safe

RS485 Isolator 3 Click electrical specifications

Description	Min	Typ	Max	Unit

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Supply Voltage	3.3	-	5	V
Isolated-Side Power Supply	3	-	5.5	V
Data Rate	-	500	-	kbps
ESD Protection	-	±15	-	kV

Software Support

We provide a library for the RS485 Isolator 3 Click as well as a demo application (example), developed using Mikroe compilers. The demo can run on all the main Mikroe development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for RS485 Isolator 3 Click driver.

Key functions

- rs485isolator3_enable_receiver_input RS485 Isolator 3 enable receiver input function.
- rs485isolator3_disable_receiver_input RS485 Isolator 3 disable receiver input function.
- rs485isolator3_disable_output RS485 Isolator 3 disable output function.

Example Description

This example reads and processes data from RS485 Isolator 3 clicks.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.RS485Isolator3

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all Mikroe compilers.

mikroSDK

This Click board™ is supported with mikroSDK - Mikroe Software Development Kit, which needs to be downloaded from the LibStock and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

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For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

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RS485 Isolator 3 click schematic

ADM2763E datasheet

RS485 Isolator 3 click 2D and 3D files

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